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THE SHOT HOLE BORER, *ANISANDRUS PYRI* (PECK), IN BRITISH COLUMBIA (COLEOPTERA, SCOLYTIDAE)*

BY WM. G. MATHERS

Vernon, British Columbia

The shot hole borer, *Anisandrus pyri* (Peck), which has been referred to as the American representative of the European species *A. dispar* (Fab.) and from which according to Swaine (1918) it is doubtfully distinct, has long been known in the eastern parts of Canada and the United States. This species has also been present for a number of years in the West where its distribution is apparently confined to the coast districts. As it has become particularly troublesome during recent years in British Columbia, and as published accounts of its occurrence in this province are very meagre, the following notes may be considered timely.

According to Wilson (1913), who referred to the species as *Xyleborus dispar* Fab., the first reported injury in the West occurred in 1901 to prune trees in Clarke County, Washington. In the same year the species was found across the Columbia River in Portland, Oregon, and by 1912 it had spread up the Willamette Valley from Portland for a distance of 125 miles.

The first published reference to the presence of this borer in British Columbia, to the writer's knowledge, is in an article by Ralph Hopping (1922), who mentioned that *Anisandrus pyri* (Peck) had been found in apple at Vancouver. However, H. F. Olds of Vancouver recently informed the writer that he has rather distinct recollections of injury by this species occurring about 1916 in the municipality of Burnaby, adjacent to the city of Vancouver, while W. Downes of Victoria, B. C., is also of the opinion that this borer was present in the district several years prior to 1922 although the earliest record in his files is of injury to cherry trees in May, 1921, at Cowichan Lake. Since 1924 the species has been much more in evidence. M. H. Ruhmann of Vernon, B. C., has specimens in his collection taken from apple at Vancouver in 1924, while Hopping has records on file of injury at Langley Prairie in the same year and at Milner in May, 1925, and has also specimens collected in March, 1926, by G. J. Spencer from apple at Langley Prairie. Downes has specimens from Vancouver taken in May, 1925, and in the National Collection of Insects at Ottawa is a large series taken in June, 1925, by R. Glendenning from horse chestnut at Vancouver. The earliest specimens in the collection of the University of British Columbia are four collected March 15, 1927, by Spencer in Vancouver. However, in 1926 Downes reported the species as spreading among young apple stock in Vancouver, while Hearle (1929) recorded that in 1928 more damage than usual was caused in the lower Fraser valley.

The writer first encountered *Anisandrus pyri* in April, 1934, when he found that it had attacked several young fruit trees, including plum, cherry, apple, and pear growing on very shallow soil in the municipality of Burnaby and also had attacked and killed twenty of 130 young Japanese ornamental cherry trees which had been set out that spring along a new boulevard in West Vancouver. In the same year, specimens of the beetles were received by Hopping from Powell River, and Glendenning (1934) reported that an infestation of *A.*

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pyri was observed in April on Washington plum trees about ten years old at Sumas, B. C., and that at Sardis, winter-injured limbs of a large cherry tree were found attacked.

Since 1934 the writer has received several reports each year concerning insect damage which was identified as the work of this shot hole borer. The localities have included Vancouver and its immediate vicinity, the Green Timbers Forestry Station, Langley Prairie, and Aldergrove in the lower Fraser valley, Ladysmith on Vancouver Island, Squamish and Gibson Landing on Howe Sound, and Powell River, about eighty miles north of Vancouver. In addition to the Japanese cherry and the common fruit trees, the hosts included walnut (*Juglans*), plane tree (*Platanus*), *Acacia*, maple (*Acer*), weigela (*Diervilla*) and native willow (*Salix*). The recovery of *Anisandrus pyri* from the latter indicates a possible source of the attacks which frequently occur on fruit and ornamental trees set out adjacent to uncleared land.

Emergence data were secured from a section of the trunk of a young plum tree caged under field conditions on April 25, 1934. The section was approximately four inches in diameter, fifteen inches long, and with a six inch branch stub, and had been attacked in mid-April. A few of the attacking beetles re-emerged in May but the majority apparently died in the tunnels after egg laying was completed. The new brood reached the adult stage early in July for on July 14 only adults, five males, which are wingless, and 138 females were found in the galleries of the branch stub, but no emergence of the new adults occurred that year. On November 7, forty-one male and eighty-eight female adults were removed from the galleries in a cross section only two inches long cut from an end of the main portion of the caged material. The infested material was overwintered in the open and re-caged on February 15, 1935. The emergence of the beetles commenced on March 14 when fourteen males and 194 females were recovered. This was the first clear, warm day for more than two weeks, and the temperature in the cage had risen well above 60° F. The following four days were cloudy and cool and no emergence occurred, but on March 19, with the temperature in the cage reaching 71°, forty-six males and fifty-four females emerged. However, with comparatively cool weather prevailing throughout the balance of March, no further emergence took place until April 1 when on that and the two following days, a total of fifty-two males and 129 females were recovered. Including the specimens taken from the galleries in 1934, the total recovery of adults from the caged sample, which consisted of less than 200 cubic inches of wood, amounted to approximately 1,000 specimens. The proportion of females to males was approximately 2.2 to 1, whereas Wilson (1913) recorded that the females usually outnumbered the males four or five to one. Pairs of adults were observed in copulation on the surface of the bark the day of emergence, but it is possible that copulation occurs also before the beetles leave the old galleries. It is of interest to note that no parasites or predators were recovered from the caged material, and that in British Columbia *Anisandrus pyri* has but one generation and a single brood per year.

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UNDESCRIBED SPECIES AND RACES OF PHALAEINIDAE (LEPID.)*

BY J. McDUNNOUGH,
Ottawa, Ont.

ACRONICTINAE

Aeronicta connecta albina var. nov.

Much paler in the ground-color of the forewing than the typical form, the olive-gray shades being replaced by whitish; this is particularly evident between the reniform and apex of wing and along the inner margin. The broad blackish shading through central portion of wing from base to outer margin is heavy and a similar shade patch occurs on costa above the orbicular and reniform; the former is filled with white and in consequence is quite a prominent feature of the maculation, the latter is also largely white-filled with a slight ochreous shade in central portion and a strong black border-line on basal side. Secondaries almost pure white with faint traces of smoky terminal shading (somewhat more pronounced in the female) and indications of a smoky post-medial line in costal half of wing. Expanse 35 mm.

Holotype—♂, Logan, Utah, July 1, 1937, (G. F. Knowlton); No. 5072 in the Canadian National Collection, Ottawa.

Allotype—1 ♀, Hooper, Utah, July 23, 1937, (D. E. Hardy).

Aeronicta sagittata n. sp.

Palpi black laterally, broadly white at base ventrally, this color extending narrowly to middle of second joint; apex of second joint with ring of white. Head and thorax an admixture of white and black scales, tegula with a median vertical black streak, thorax with two parallel submedian black streaks. Abdomen white with traces of a median black line. Primaries narrow, elongate, white, heavily sprinkled with blackish, giving a pepper and salt effect. A fine basal black streak extending to t. a. line and bordered on costal side narrowly with white. T. a. line improminent, best recognized below cell where it forms a strong, sharp, outward tooth, finely black, bordered outwardly with white. Orbicular small, flat, white-filled, narrowly outlined in black; reniform indistinct, the basal edge outlined by a black, lunate mark; spots more or less connected by black shading along upper edge of cubitus, which extends shortly outward along basal sections of veins 3 and 4. T. p. line indistinct, finely black, edged inwardly with white, angled outwardly below costa, forming a sharp tooth on vein 7, obsolescent opposite cell, then very strongly dentate, the teeth almost attaining outer margin. A fine black streak extends basad from t. p. line above reniform, another thicker one (a prominent feature of the maculation) occurs in the median area above vein 1, a marginal black streak above anal angle extends backward to t. p. line and two more indistinct black streaks are found in the terminal area opposite cell. Fringes white, checkered interspaceally with black. Secondaries pure white, slightly hyaline with faint smoky sprinkling around apex and on white fringes. Expanse 37 mm.

Holotype—♂, Richfield, Utah, July 15, 1930; No. 5073 in the Canadian National Collection, Ottawa.

Belongs in the *oblinita* group but I have been unable to find any description that would at all fit it and presume it to be undescribed.

PHALAEININAE

Genus *Euxoa* Hbn.

In the course of identification work in this genus for correspondents I have run across various forms which do not seem to fit well under any of the described species or races. While I fully realize that in a large and complicated genus like the present one new names are apt to prove considerable of a nuisance

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to other workers, I believe I am justified in describing some of the more striking of these forms; it serves to call attention to them at least and the actual status (whether species, race or mere form) can presumably be worked out at some later date when more material has accumulated.

***Euxoa unica* n. sp.**

Palpi with second joint outwardly strongly black-scaled, fringed below with long hairs of a mixed ochreous and pinkish color; third joint paler, more ochreous. Male antennae strongly serrate and fasciculate. Head vestiture purplish brown. Basal half of collar and tuft at base of forewing light yellowish ochre, former with slight admixture of black scaling; apical half of collar purplish brown, separated from the paler basal half by a transverse line of black, edged narrowly below with whitish. Thoracic vestiture purple-brown, slightly mixed with white and ochreous in central portion. Forewings purple-brown, costa from base to inception of t. p. line broadly pale ochreous-white, some ochreous shading in the median area around the claviform and more distinctly along inner margin and smoky shading between the orbicular and reniform and terminally. Maculation sharp and well-defined. Basal, t. a., and t. p. lines indicated on the paler costa by short geminate black streaks with pale filling. A short blackish basal dash. T. a. line bent gently outwards in a single scallop between cubitus and vein 1, black, with an inner edging of pale ochreous; below vein 1 it juts strongly outward, is less black in character and edged broadly both inwardly and outwardly with pale ochreous. Claviform a narrow, black loop, attached to the central portion of t. a. line; orbicular moderate, whitish, circular, faintly outlined in black, open toward costa; reniform rather squat, light ochreous with central purplish filling, narrowly and indistinctly outlined in black. The whole cell is filled with a deep blackish-purple shade, strongest between the two spots which are thus sharply defined; cubitus vein narrowly white. Median smoky shade-line, faint at costa, continued below reniform parallel to t. p. line; this line angled sharply outward just below costa, then rather rigid and inwardly oblique to inner margin with faint traces of dentations in lower portion; outwardly above inner margin it is bordered by a pale ochreous shade. Subterminal area rather even purple-brown, the color gradually merging into the deep smoky purple of the terminal area. S. t. line pale, irregularly and feebly dentate and somewhat broken, emphasized by preceding black arrow-marks and some slight white sprinkling at apex of wing; there is no distinct W-mark as in allied species, veins 3 and 4 being merely very narrowly and faintly marked with white through the terminal area. Fine black terminal line. Fringes purplish with a pale ochreous basal line. Secondaries white with a smoky outer border, a dark broken terminal line, and white fringes. Beneath primaries smoky with pale costa, broken black terminal line and pale line at base of smoky fringes; secondaries white with smoky sprinkling along costa and broken dark terminal line; faint traces in costal half of wing of a postmedian line. Expanse 34 mm.

Holotype—♂, Saskatoon, Sask., Aug. 23, 1937, (K. M. King); No. 5071 in the Canadian National Collection, Ottawa.

The correct relationship of the species is rather doubtful to me. It has a certain superficial resemblance to *henrietta* Sm., but in other respects approaches perhaps more closely to *brevipennis* Sm. in which vicinity I am inclined to place it for the present.

***Euxoa spumata* n. sp.**

Palpi light brown with considerable blackish scaling outwardly. Male antennae strongly serrate and fasciculate. Head and thorax light brown with a slight pinkish tinge, the patagia variably sprinkled with smoky scaling. Forewings similar in color to thorax, rather even in coloration with fine smoky

sprinkling and with indistinct maculation; basal, t. a., and t. p. lines each indicated on costa by geminate, blackish dashes enclosing a pale spot. T. a. line indistinctly geminate, imprecise, the outer dark line and the pale filling being most noticeable, course in general upright with slight inward angles on cubitus and vein 1. T. p. line very indistinct, the pale filling with darker inward edging being just traceable, rounded outwardly below costa and then parallel to outer margin and minutely dentate. Orbicular and reniform faint, the former indicated by a circular patch of pale scaling, the latter also pale, moderate in size, with a patch of smoky scaling in lower portion. Three minute pale dots on costa subterminally. Faint smoky terminal shading, crossing which are traces of a pale, irregularly wavy s. t. line, rather close to outer margin. A fine broken, black terminal line. Fringes concolorous, slightly checkered with smoky and with a pale basal line. Secondaries white with rather faint smoky terminal shading, a terminal dark line and white fringes. Beneath whitish with faint smoky sprinkling apically, a smoky, lunate, discal mark on primaries (not always present) and broken dark terminal lines. Fringes pale. Expanse 35 mm.

Holotype—♂, Three Forks, Montana, Aug. 22, 1929; No. 5070 in the Canadian National Collection, Ottawa.

Paratype—1 ♂, same data, Aug. 15.

The species belongs apparently in the *misturata* group, but is at once separated on characters of the male genitalia, the distance between the two prongs of the harpe being abnormally wide.

Euxoa permixta n. sp.

Male antennae weakly serrate and fasciculate. Palpi light buff, second joint considerably tinged with smoky and base entirely smoky. Head, thorax and primaries light buff with a slight pinkish shade; collar crossed by a decided blackish band. Maculation of primaries very obscure, the geminate t. a. line indicated by a dark spot on costa and faintly traceable across the wing, forming three outward scallops; t. p. line also marked on costa by a dark spot followed by a light one, otherwise barely indicated by the slightly paler filling, strongly outcurved below costa and then subparallel to outer margin. Orbicular obscure, small, circular, partially outlined by faint dark scaling (in ♀ this scaling is lacking); reniform still more obscure, inner edge indicated by a few dark scales; claviform absent. S. t. line indicated by a faintly smoky shade. A distinct terminal broken line, consisting of small blackish lunules. Fringes concolorous, faintly tinged with smoky and with a pale basal line. Secondaries dirty whitish with a considerably darker, smoky, terminal band, merging gradually into the paler color of the basal half of wing. Fringes whitish with a faintly yellowish basal line. Beneath dull whitish, apical portion of wings sprinkled with smoky buff, the only prominent maculation on primaries is the dark broken terminal line. Secondaries paler than primaries with a small, smoky discal dot, dark dots on the veins indicating a postmedian line and a terminal series of lunules as on primaries. Expanse 33 mm.

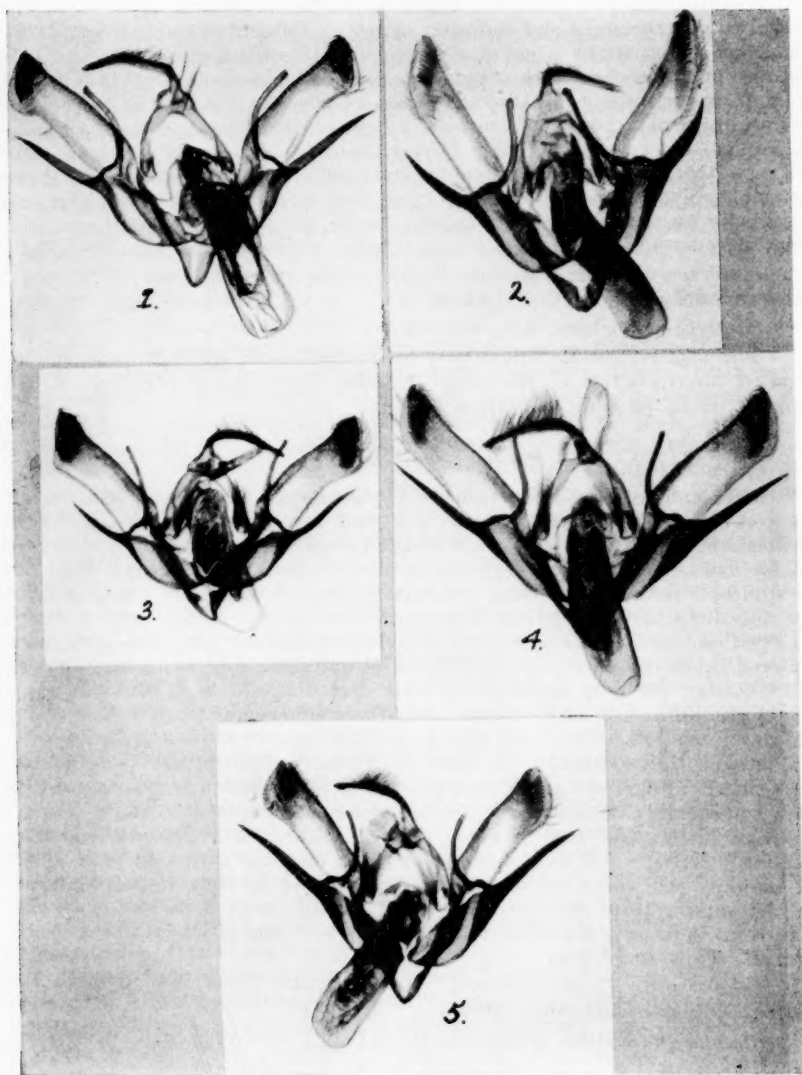
Holotype—♂, Payson Canyon, Utah, July 24, 1933; No. 4882 in the Canadian National Collection, Ottawa.

Allotype—♀, Eureka, Utah, July 10, 1911, (T. Spalding) ex Coll. Wolley-Dod.

A third, worn, female specimen is also before me from Stockton, Utah, which I am not including in the type series, due to its condition.

Probably best placed in the *bicollaris* group and apparently closely allied to the Texan *immixta* Grt. in general coloration; distinguished from this species by the dark band on collar. It is less distinctly marked than *inyoca* Benj., especially subterminally.

PLATE XIII.



Male Genitalia of 1. *Euxoa unica* n. sp.; 2. *E. spumata* n. sp.; 3. *E. permixta* n. sp.; 4 *E. luteotincta* n. sp.; 5. *E. altera* n. sp.

***Euxoa medialis rufosuffusata* var. nov.**

In typical *medialis* from Texas and Utah the ground-color of primaries is grayish fawn; in the variety *poncha* Sm. from Colorado (extending into the Prairie Provinces) this color is light ochreous and in var. *truva* Sm. from Glenwood Spgs., Colo., there is a pale pinkish suffusion evident. The present form, which probably represents an Arizona race, has thorax and primaries of a deep ruddy color, much as in *mimallonis* and some forms of *gagates*. The maculation of primaries is more distinct than usual, the t. a. line and median shade being well-marked in black; the terminal area shows a light smoky suffusion. The white secondaries show a narrow, terminal, smoky shading and the veins are partially outlined in smoky; the male genitalia are similar to those of *truva*. Expanse 40 mm.

Holotype—♂, Maricopa, Ariz., October 1937; No. 5074 in the Canadian National Collection, Ottawa.

In order to distinguish this form from allied species it seems in order to propose a name for it.

***Euxoa atropulverea* Sm.**

Benjamin (1935, Bull. S. Calif. Acad. Sci. XXXIV, 200) first noted that the female type in the United States National Museum strongly suggested a dark example of *scotogrammoides* McD. After a personal examination of this type I fully concur with such a reference. For our British Columbian species which has erroneously been posing as *atropulverea* a new name seems necessary.

***Euxoa luteotincta* n. sp.**

Male antennae very feebly serrate and fasciculate. Palpi and head deep smoky with slight ochreous tinges at base of palpi ventrally, behind the eyes, and at base of antennae. Collar and thorax deep smoky with traces (at times) of a dark median line across former. Primaries deep smoky with a faint olivaceous tinge and slight and variably distinct ochreous sprinkling along the submedian fold from base of wing to median shade, and also more faintly near base of inner margin. Basal half-line indicated by two short oblique dark streaks on costa filled with ochreous; t. a. line indistinctly geminate; outer line strongest originating from geminate oblique dark streaks on costa with pale filling, in general upright with slight outward projections in the fold and above inner margin, the former relieved by the already mentioned ochreous shade. Median dark shade-line, angled below reniform. Orbicular and reniform incompletely outlined in ochreous with dark central filling, former small, circular, latter rather large and lunate. T. p. line indicated on costa by geminate, pale filled, dark dashes, bent strongly outward around cell, then parallel to outer margin and gently dentate, bordered outwardly by a narrow pale shade. S. t. line arising from a minute oblique pale dash before apex of wing and continued by small ochreous dots or short dashes, bordered inwardly by a deep smoky shade occupying outer third of the subterminal area. Two or three minute pale points on costa subterminally. An indistinct broken dark terminal line. Fringes smoky, deepest in color in basal half and with paler basal line. Secondaries deep smoky, scarcely paling basally. Fringes smoky in basal half with an ochreous basal line, dull whitish outwardly. Beneath primaries evenly smoky with slight ochreous shading along costa and outer margin and a terminal broken dark line, relieved slightly by ochreous. Secondaries pale smoky ochreous, sprinkled lightly in costal half of wing with smoky; a prominent dark discal spot and curved, rather broad postmedian line; terminal area in lower half of wing shaded with smoky. Fringes pale at base, smoky outwardly. Expanse 37-39 mm.

Holotype—♂, Seton Lake, B. C., Aug. 4, 1933, (J. McDunnough); No. 5075 in the Canadian National Collection, Ottawa.

Allotype—♀, Peachland, B. C., Aug. 10, 1912, (J. B. Wallis).

Paratypes—1 ♂, 1 ♀, same data as holotype, Aug. 8, July 30; 1 ♂, Fish Lake, Summerland, B. C., Sept. 12, 1932, (A. N. Gartrell); 1 ♀, Cowichan Bay, Duncan, Vanc. Is., B. C. (Coll. C. Livingston, ex Coll. Wolley-Dod).

The amount of ochreous suffusion on the primaries is variable; in the holotype and allotype it is as indicated, but in some of the paratypes it is considerably reduced, although traces are still evident. The species apparently belongs to the *fumalis* group, judging by the genitalia (fig. 4) but the finely serrate antennae in the male and the ochreous suffusion are quite characteristic.

***Euxoa altera* n. sp.**

Male antennae rather feebly serrate and fasciculate. Palpi light gray, shaded on outer side of second joint with smoky. Vestiture of head and thorax composed largely of hair and hair-like scales, gray or whitish gray. Primaries rather even gray with at times a tinge of creamy or ochreous. Cross-lines single, blackish, normally well-defined. Basal line indicated by two short dark streaks on costa and obscure marks at base of cell. Both t. a. and t. p. lines arising normally from geminate streaks on costa (sometimes reduced to a single streak); t. a. line upright, composed of three scallops, that above inner margin projecting slightly; median shade-line present but generally faint, angled below reniform; orbicular absent (or at most indicated by a faint, oval, whitish shade); reniform indicated faintly by the lunate, smoky, central filling (at times relieved by obscure, pale lines before and behind); t. p. line distinct, sharply bent around end of cell, then quite strongly dentate and parallel to outer margin; s. t. line scarcely indicated by a very obscure smoky shade defined faintly, outwardly by a wavy, paler line. Terminal row of black dots. Fringes concolorous with fine, pale, basal line. Secondaries rather deep smoky at times paling slightly towards base of wing. Fringes light smoky in basal half with a pale basal line, outwardly whitish. Beneath primaries smoky, paler along costa and in terminal area; obscure smoky discal lunule and postmedian line. Secondaries whitish, sprinkled lightly with smoky along costal area; variably distinct smoky shading terminally along lower two-third of outer margin; a distinct smoky discal spot and curved postmedian line, slightly scalloped centrally. Expanse 35 mm.

Holotype—♂, Cartwright, Man., Aug. 23, 1903, (E. F. Heath); No. 5076 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, Sept. 1.

Paratypes—8 ♂, 5 ♀, same locality and collector, various dates in August and September.

It is this species which was figured by Hampson (1903, Cat. Lep. Phal. B. M. IV, 271, Pl. LXV, fig. 3) as *incallida* Sm. and which has been discussed under the same name (or as *5-linea* Sm.) by Wolley-Dod (1905, Can. Ent. XXXVII, 56; 1911, *lc.* XLIII, 362). Its exact relationship is problematic and will have to wait solution of the muddle at present existing regarding *5-linea* Sm., *lutulenta* Sm. and *incallida* Sm., all described from the Sierra Nevada Mts. Calif. (probably vicinity of Truckee). It is certainly not typical *incallida* which is a much darker, smokier insect according to the unique female Type in the U. S. N. M.; possibly it may have a closer association with *vulpina* Sm., about which also so little is known. In this whole group the male genitalia are very similar and subject apparently to considerable individual variation; they offer, therefore, little help in the way of specific differentiation.

There is considerable variability in the distinctness of the cross-lines of primaries; in some specimens they are almost obsolete, in which cases the median shade, usually obscure, may gain in distinctness. In my type series I have only included specimens of more or less uniform coloration: certain other specimens in our long series from the same locality are deeper gray and others again tend towards a more ochreous shade.

Anomogyna atrata ursae var. nov.

Male. Similar in size to the variety *yukona* McD., but rather darker in color of forewings with the orbicular and reniform much more distinct, these spots being definitely outlined (and at times partially filled) with black, the former very small, circular, the latter small, lunate. The t. p. line is well-defined, strongly serrate and bordered outwardly by a narrow, pale area. Expanse 33-35 mm.

Holotype—♂, Cameron Bay, Great Bear Lake, N. W. T., July 9, 1937, (T. N. Freeman); No. 4881 in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, same data, July 8, 13.

HADENINAE

Lacnipollia prognata n. sp.

Male antennae weakly serrate and fasciculate. Palpi smoky outwardly, third joint paler. Head gray with an admixture of black, front crossed by a dark band; collar gray with a prominent black subapical cross-line. Thorax purplish-gray, some of the scaling tipped with white or black. Primaries purplish-gray with fairly distinct maculation, smoother in appearance than *agnata*. T. a. line geminate, smoky, pale-filled, outwardly oblique from costa to submedian interspace, then perpendicular to inner margin, outer line of the two inclined to be heavier than the inner one. Median area with faint smoky suffusion especially in costal area. Orbicular and reniform outlined in black, pale-filled with central darker shade, former circular, moderately large, latter rather broad and chunky, with little constriction and open narrowly toward costa; claviform a black, pointed loop, variable in size. T. p. line rather indistinct in costal portion, angled outwardly around cell and then slightly incurved, touching outer lower angle of reniform, weakly dentate on veins. S. t. line faint, whitish angled slightly below costa, in general parallel to outer margin, more distinct at anal angle and bordered inwardly by a blackish spot, one of the most prominent features of the maculation. Broken terminal dark line. Fringes concolorous. Secondaries smoky, paling in basal half to dull whitish; a faint, smoky, discal mark. Fringes smoky in basal half with pale basal line, dull whitish outwardly. Beneath primaries smoky with paler costa and outer margin, secondaries whitish; smoky discal dots and postmedian lines on both wings.

Holotype—♂, Cave Cr. Chiricahua Mts., Ariz., May 24, 1934, (J. A. Comstock); No. 5080 in the Canadian National Collection, Ottawa.

Allotype—1 ♀, same data, in Coll. Los Angeles Museum.

Paratypes—1 ♂, same data as holotype, in Coll. Los Angeles Museum; 7 ♂, 2 ♀, same locality, May 23-24, 1934, (G. and J. Sperry); in the Canadian National Collection, Ottawa and Coll. G. Sperry, Riverside, Calif.

The genitalia are similar to those of *agnata* Sm., the claspers are somewhat longer, the harpe shorter and narrower with the pollex closer to its base than in *agnata*. At the apex of the aedeagus the lateral spine is bent backward and the apical spine is broader and blunter.

In some of the paratypes the black tornal patch is reduced; such specimens can easily be separated from *agnata* by the pale purplish gray color of forewings and the lack of any definite basal dash.

CUCULLINAE

Homohadena badistriga tenuistriga var. nov.

Differs from the typical form in the more evenly brown coloration of the primaries, the whitish suffusion of costal and inner margins being much less evident. The black basal streak and that from cell to outer margin are much

thinner. The smoky border on hindwings in the male is somewhat more extended.

Holotype—♂, St. Paul, Minn., July 21, 1927, (C. T. Schmidt); No. 5082 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, August 6.

Paratypes—1 ♂, same data, July 23; 1 ♀, Pt. Colborne, Ont., July 16, 1933, (J. J. de Gryse).

Looks distinct enough to be considered a good species, but as I can detect no genitalic differences I treat it as a race for the present.

Genus *Apharetra* Grt.

Two very similarly marked species have been described and placed in this genus. The first, *dentata* Grt., described from Quebec, is rather inadequately figured by Hampson (Cat. Lep. Phal. IV, Pl. 78, fig. 21); it is much the paler of the two, the ground color of primaries being whitish, suffused, principally in the median area, with light purplish-gray. Two specimens, male and female,



1. Larva of *Apharetra purpurea* n. sp.

from White Pt. Beach, N. S. in our collection seem to match very well. The second species, based on two females from Calgary, Alta. is much darker, the primaries being deep smoky with the t. a. line, inwardly, and the t. p. line, outwardly, narrowly relieved with white edging; it was well figured by Smith (Ent. News, VI, Pl. XV, fig. 1) and also illustrated by Hampson (*l.c.* fig. 22) but the latter's figure is poor and not typical. Smith and Dyar's figures in their *Acronycta* revision (Pl. XIII, fig. 11 and 12) are also not so satisfactory. I can match Smith's figure excellently with a male from High River, Alta. and there are several other specimens in the collection from Calgary, Alta. and Aweme, Man. which, still more suffused with dark shades, appear to belong here. In general *pyralis* appears to be slightly larger than *dentata* but I am by no means certain that it is a good species; it might readily be a western race of *dentata*.

In eastern and north-eastern Ontario a form occurs which cannot be satisfactorily placed under either of the above names; it is characterized by the *even bluish-purple color* of the primaries; the maculation is distinct and similar to that of the other two forms but the cross-lines are not relieved by whitish edging, this color being only slightly paler than the ground-color. The triangular

dark shade, extending from base of reniform to the mid-section of the outer margin is generally quite prominent. The average wing expanse is 30 mm. The striking velvety-brown larva (fig. 1.) with white dorsal diamond patches and spiracular stripe may be swept when young in early spring from *Vaccinium*. As this form appears quite constant in the Ottawa and adjacent regions I propose for it the name *PURPUREA* n. sp. Until further knowledge of the other two forms is available the name may be given specific rank.

Holotype—♂, Mer Bleue, Ottawa, Ont., July 19, 1934, (W. J. Brown); No. 5081 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—1 ♂, Kazubazua, Que., June 28, 1933, (G. S. Walley) (bred); 1 ♀, Laniel, Que., Aug. 28, 1932, (W. J. Brown); 2 ♂, 3 ♀, Biscotasing, Ont., July 22, 28, Aug. 6, 15, 16, 1931, (K. Schedl); 1 ♀, Constance Bay, Ont., Aug. 12, 1936, (F. A. Urquhart).

AMPHIPYRINAE

Septis ampliata n. sp.

Very similar in color and maculation to the form *separans* Grt. of *indocilis* Wlk. Primaries appear slightly more elongate. Maculation practically similar to that of *separans*, but median space at inner margin considerably wider than is usual in *separans*. Collar and thorax dusted with whitish; a black transverse line across collar and black edging dorsally to patagia. Primaries less evenly brown than in typical *separans*; besides pale sprinkling above basal dash and along basal portion of inner margin, a palish shade extends from centre of reniform to s. t. line and the whole s. t. space is lightly sprinkled with whitish, most marked before anal angle. W-mark quite prominent. Orbicular rather large, concolorous, almost circular, imperfectly ringed with black which is bordered inwardly with white; reniform large, partially pale-filled, defined inwardly by a black line which seems more lunate than in *separans* and more as in some specimens of *indocilis*; claviform a large black loop connected with t. p. line by a narrow black line; a rather distinct blackish median line is sharply angled below reniform and shows two small teeth above inner margin. Expanse 40 mm.

Holotype—♂, Bozeman, Mont., June 3, 1928; No. 5083 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, June 26.

The male genitalia are very similar to those of *indocilis* and its various forms. There are, however, certain differences which lead me to believe that we are dealing with a distinct species. Chief among these is the fact that the angle formed by the ventral margin of the cucullus with that of the neck of the clasper is not nearly so acute as in *indocilis*, being almost a right angle; furthermore the ampulla is *decidedly shorter and thicker*, especially at base, than I have found in any specimens of *indocilis* of which the genitalia have been examined, this feature being apparently very constant.

ACONTHINAE

Acontia knowltoni n. sp.

Male. Palpi white in basal portion, third joint blackish. Head and thorax metallic black-brown with a slight admixture of white and olivaceous scaling. Abdomen black-brown with the posterior margins of segments ringed with white. Primaries with ground-color to t. p. line a deep olivaceous, heavily suffused with dark leaden color in the basal portion; a large white irregularly rectangular patch at middle of costa, containing near its lower, inner corner the small, round, black orbicular; a portion of the narrow upright dark reniform is visible in the lower, outer section; at middle of inner margin of wing

a diffuse whitish shade, more or less connected with base by white shading along vein 1. T. a. line obscurely indicated by an irregular, indistinct white line, crossing wing shortly basad of the above-mentioned white areas; t. p. line originating in a narrow, white, triangular spot on costa, sinuate, metallic blue, relieved inwardly by black, triangular, or lunate spots; s. t. line irregular, whitish, obscure at costa, strongly relieved by large, black, arrow-marks which extend across the liver-brown, subterminal space to t. p. line. Terminal space similar in color to subterminal one but this color largely obscured by metallic, leaden scaling, especially in the lower portion. A terminal, broken, black line, composed of broad streaks. Fringes deep liver-brown cut narrowly below apex and broadly at vein 3 by whitish. Secondaries deep blackish with white fringes except at base where they are deep smoky. Beneath primaries blackish with a whitish spot in outer portion of cell and another on the subterminal area of costa, the basal half of which is narrowly pale; a small, black, discal spot, forming outer margin of pale cellular spot. Secondaries whitish, broadly black along outer and inner margins, from which dark area black streaks extend backward along both sides of cell to base of wing; a broad black discocellular dash. Fringes on both wings as above. Expanse 22 mm.

Holotype—♂, Logan, Utah, July 29, 1937, (G. F. Knowlton); No. 5088 in the Canadian National Collection, Ottawa.

Paratypes—7 ♂, same data, July 25-29.

The species is close to *abdominalis* Grt., especially to the females, in maculation but differs from it genitally. The most noteworthy feature is the asymmetry of the sacculus, that of the right side showing a finger-like projection from inner margin at base whilst on the left side there is a more rounded projection near apex. It may be this species which was figured in the Barnes & McDunnough Contributions, Vol. I, No. 4, Pl. XIX, fig. 16, as *abdominalis*. I take pleasure in naming the species after Dr. G. F. Knowlton who has supplied me with much interesting material from the Logan region.

CATOCALINAE

Zale obliqua Gn.

In Smith's revision of the genus *Zale* (1908, Proc. U. S. N. M. XXXV, pp. 247-61) he splits the difficult *obliqua* group into a number of closely allied species, basing his separation both on characters of the male genitalia and of maculation and color. Later Haimbach (1928, Trans. Am. Ent. Soc., LIV, 227) sinks *obliqua* to *squamularis* Dru., claiming it to be merely the female sex of Drury's species; he also sinks *curema* Sm. to *metata* Sm. In my 1937 Check List I restored both *obliqua* and *curema* to specific rank; a fairly comprehensive genitalic study of the species involved led me to conclude that Smith's work was in the main correct and that Haimbach's synonymy should be disregarded. In this connection I should like to express my thanks to Mr. F. Lemmer of Irvington, N. J. who supplied me with much material in the group, and to Mr. O. Buchholz of Westerfield, N. J. who made very careful comparisons of specimens (now before me) with those of Smith's types in the Rutgers College Collection at New Brunswick, N. J. The wide experience of these two entomologists with the species in the field was of great assistance to me.

Smith's figures of the male genitalia (*op. cit.* Pl. XXXII) are difficult to interpret correctly, due partly to the fact that the drawings have been made from the dorsal side and that in consequence the various differentiating characters, which are largely on the ventral surface of the organs, are obscured. In the case of *obliqua*, however, his figure is fairly clear and it became evident, after genitalic slides had been made, that this figure (*op. cit.* fig. 7) did not represent the male genitalia of the true *obliqua*. Smith's series was apparently mixed for, from information received, his series under *obliqua* contained the

true species; unfortunately when the genitalic slides were made Smith neglected to make any notation whereby each individual slide could be connected up with the moth from which it was obtained; in consequence, no definite evidence as to the source of the specimen on which his figure was based can be secured.

The genitalia of the true *obliqua* (which is well figured by Haimbach on Pl. XXIII, fig. 6) are very similar to those of *squamularis* and *benesignata* (Smith's figs. 11 and 12) and are without the strong inward projection of the right sacculus mentioned by Smith. I have matched Smith's figure with the genitalia of a specimen from Hope, Arkansas and find a second similar male specimen without abdomen from "Mo. Collection S. T. Kemp" which came to us with the Wolley-Dod Collection and bears a label in Dod's handwriting "*Homoptera obliqua*, ex Coll. Smith"; this might very readily be the actual specimen on which Smith's figure was based, Missouri being cited as one of the localities for *obliqua* and Smith's generosity in the distribution of specimens to various collectors being proverbial. To clear up the muddle I offer the following description.

***Zale confusa* n. sp.**

Zale obliqua Sm. (nec Gn.) 1908, Proc. U. S. N. M., XXXV, 247, Pl. XXXII, fig. 7 (*partim*).

Very similar to *obliqua* Gn., but the wings of a distinctly browner shade, (much the color of *metata* Sm.), due to the almost complete absence of the white sprinkling found in *obliqua*; in certain lights the outer half of primaries shows a marked violaceous tinge. Maculation much more obscure than in *obliqua*; this is particularly the case with the t. p. and s. t. lines which, while faint in *obliqua*, are generally traceable; in the present species the t. p. line is almost obsolete, except at costa and the s. t. line only visible in the lower half as a fine, black, incurved line. In the holotype a white blotch is present above the anal angle which is much obscured in the other specimen. In the holotype, furthermore, the orbicular is indicated by a black dot and the reniform by a narrow blackish lunule, both these being much obscured in the paratype.

Holotype—♂, Hope, Ark., June 29, 1926, (L. Knobel); No. 5089 in the Canadian National Collection, Ottawa.

Paratype—♂, "Mo." (Coll. S. T. Kemp) (*ex* Coll. Smith and Wolley-Dod).

**THE NEARCTIC SAWFLIES OF THE GENUS *NEUROTOMA*
(HYMENOPTERA, PAMPHILIIDAE)**

BY WOODROW W. MIDDLEKAUFF,
Cornell University, Ithaca, New York

While studying the undetermined sawfly material in the Cornell University insect collection, the author discovered what he believed to be a species new to science in the genus *Neurotoma*. This belief was kindly confirmed by Dr. H. H. Ross who said that he likewise had a single specimen. Since that time four years ago, the author has collected this same species in considerable numbers and has also collected the larvae from the host plant which is *Crataegus* sp. It is therefore proposed to name it *Neurotoma crataegi*.

Ross* gives a key to the genera of Pamphiliidae and also lists the most important generic characters. *Neurotoma* is separated from the other genera in this family chiefly on the absence of a preapical spur on the front tibia and on the whole or partial atrophy of Sc_1 of the front wings (figs. 9, 10). The genus has contained but two described Nearctic species. The adults as well as the larvae are quite distinct and may be readily separated by use of the following keys.

KEY TO ADULTS

1. Tibiae entirely black. *crataegi* n. sp.
Tibiae mostly yellow or rufous. 2

*Ross, Herbert H. A Generic Classification of the Nearctic Sawflies (Hymenoptera, Symphyta). Univ. of Ill. Bull. No. 94, Vol. XXXIV. (1937).

2. Head with yellow mark below antennae; legs colored with bright yellow; at least basal half of wings heavily infusate. *fasciata* (Nort.)
 Head entirely black below antennae; legs almost entirely rufous; wings mostly hyaline except for a light smoky band below stigma *inconspicua* (Nort.)

KEY TO LARVAE

1. Head piceous or very dark brown, in younger specimens paler; dark patches on body not conspicuous; subanal appendage brown; length 22 mm.; width of head, 2.1 mm.; on wild cherry. *fasciata* (Nort.)
 Head lighter in color, yellowish or sometimes brownish yellow; dark patches on body conspicuous; subanal appendage not brown, entirely or partly black. 2
 2. Black area on tenth abdominal sternum not divided, completely covering sternum; length 19 mm.; width of head, 1.8 mm.; on plum and sand cherry. *inconspicua* (Nort.)
 Black area on tenth abdominal sternum divided in middle, not completely covering sternum (fig. 8); length 22 mm.; width of head, 2.0 mm.; on hawthorn. *crataegi* n. sp.

***Neurotoma crataegi* n. sp.**

Female. Length of body 7.1-9 mm.; length of front wing 6.5-9 mm.; width of head 2.1-2.6 mm. Color: Head, antennae, legs, and abdomen black with the exception of the following parts: clypeus mostly white, with a more or less white area extending from it between the antennae almost to the median ocellus; the raised area between the antennae black. Other white markings as follows: area between compound eye and insertion of the antennae extending inward and upward towards the lateral ocelli; a line on the posterior margin of head below compound eye extending to vertical furrows; a line on each side of each vertical furrow; an area on postocular region which sometimes diverts and extends posteriorly, one arm joining the outer vertical furrow line and the other the line on the posterior margin of the head; collar; anterior portion of prescutum; spot on lateral lobe of pronotum; spot on cervical sclerites; posterior margins of parascutellum and of scutellum; posterior margins of dorsal abdominal segments six, seven, and eight; a triangular spot on caudo-lateral angles of the second to eighth segments, and usually a spot on posterior coxae.

Antennae with 17-18 segments; two basal segments sparsely punctate, polished; remaining segments finely punctate, dull; third antennal segment as long as the fourth, fifth, and sixth together; head below a line drawn through the lateral ocelli roughly rugose; behind this line the head is finely pebbled resembling the facets of the compound eye as seen under 40x magnification; postocular and postocellar areas slightly punctate; posterior margin of head truncate; lateral lobes of pronotum with numerous long hairs; mesepisternum densely rugose with rather dense, curved, silvery hairs; prescutum mostly pebbled; shoulders and median portion of scutum pebbled, the remaining portion with numerous large punctures; scutellum flat, heavily rugose; abdomen and legs densely, finely striate; wings smoky; spur of Sc_1 present or absent (figs. 9, 10).

Male. Length of body 7-9 mm.; length of front wing 7-7.5 mm.; width of head 2.1-2.2 mm. Color: Similar to female with the following exceptions: lateral angles of clypeus black; black area in centre of frons much smaller; white area between compound eyes and antennae smaller; white spot on postocular area smaller; white lines bordering vertical furrows much reduced or absent; line bordering head narrower; collar lacking white line; spot on hind coxae absent.

Structural features similar to female with the following exception: antennae from 15-18 segmented.

Holotype—♀, Cascadilla walk, corner of Oak and College Ave., Ithaca, N.Y., April 29, 1939. (Woodrow W. Middlekauff). Collected on *Crataegus Brainerdi* Sarg. In the collection of Cornell University.

Allotype—♂, same data.

Paratypes—31 ♀♀; Ithaca, N. Y., April 20, 1912, 1 ♀; May 3, 1914, 9 ♀♀; April 25, 1915, 7 ♀♀; May 25, 1915, 2 ♀♀; April 27-May 1, 1939, 12 ♀♀ on *Crataegus Brainerdi* Sarg. and *Crataegus succulenta* Schrad. (W. Middlekauff Coll.).

37 ♂♂; Urbana, Ill., April 18, 1915, 1 ♂; Ithaca, N. Y., May 3, 1914, 1 ♂; April 25, 1915, 3 ♂♂; May 25, 1915, 3 ♂♂; April 25, 1936, 1 ♂ (E. Greenspan Coll.); April 27-May 1, 1939, 28 ♂♂ on *C. Brainerdi* Sarg. and *C. succulenta* Schrad. (W. Middlekauff Coll.).

In collections of Cornell University, of the author, and of the United States National Museum.

Between April 27 and May 1, 1939, the author noticed a considerable number of adults actively flying about and crawling on several species of *Crataegus* which were not yet in blossom. Dr. K. M. Wiegand of the Botany department identified them as *Crataegus succulenta* Schrad. and *Crataegus Brainerdi* Sarg. While the adults are good flyers, they did not appear very nervous and several were picked from the branches where they were actively crawling about and rapidly moving their antennae. Others were collected by sweeping beneath these trees, and a few were taken as they flew rapidly about. Copulation was also observed at this time. The eggs were not discovered, but on May 24, 16 larvae were collected in various stages of development from these two trees. On May 12, 1940, several twigs were brought into the laboratory to be examined more closely for the eggs. These were discovered not inserted in the tissue as might be expected, but rather stuck to the outer surface of a leaf bract. No more than a single egg per leaf cluster was found. This agrees with the finding of a single larva per cluster in past seasons. The eggs are a dirty gray, oblong in shape, measure 1 x 1.5 mm. and are partially covered by debris. The eggs swelled somewhat and the larvae emerged three days later. They immediately began to excavate the sides of the young flower buds. Other species of *Crataegus* in the vicinity yielded neither adults nor larvae at any time. The larvae are not gregarious, but live singly in small webs made over a flower bud and several of the small leaves. The other species in this genus are gregarious and web the entire tree. Considering the number of adults which had been seen around these trees, the larvae seemed remarkably scarce.

Larvae. Third instar: Length 8.9 mm.; width of head 1.05-1.10 mm.; body slender, subcylindrical, slightly flattened on the ventral aspect; thoracic legs present; larvapods absent; antennae setaceous, seven segmented; sensoria present on segments two, three, and five; subanal appendage present, three segmented; length of basal segment .25 mm.; second segment .10 mm.; terminal segment .175 mm. Numerous long setae present sur- and subanally.

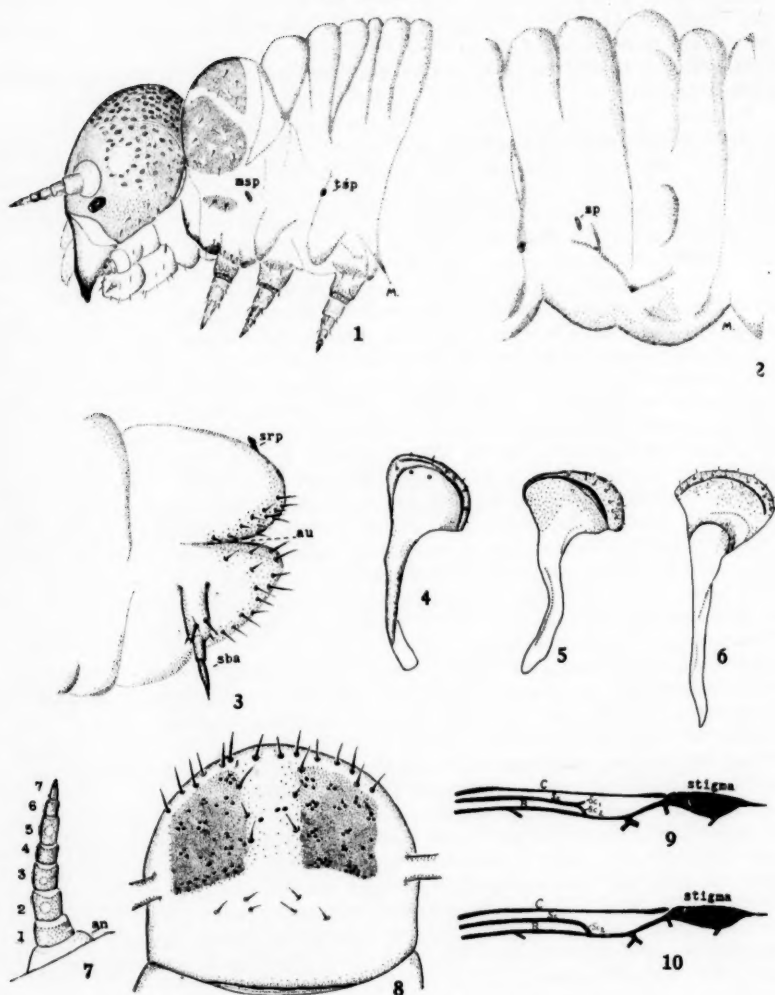
Color of living specimens mostly pale greenish, fading to white in alcohol. With other markings as follows: head, mouthparts, antennae, prothoracic shield, two lateral and a ventral prothoracic area, thoracic legs, two small areas on sternum of pro- and mesothorax, small area above each coxa and subanal appendage mostly brown, but varying from blackish brown to dark or sometimes yellowish brown. Head beyond ocellaræ and above cheeks densely covered by small patches of darker brown (fig. 1). Ocellaræ black and somewhat protruding (fig. 1). Ocularium white.

Fourth instar: Length 10 mm.; width of head 1.20 mm.; coloration same as in third instar; length of basal segment of subanal appendage .30 mm.; second segment .125 mm.; terminal segment .25 mm.

Fifth instar: Length 10 mm.; width of head 1.35-1.40 mm.; length of basal segment of subanal appendage .35 mm.; second segment .15 mm.; terminal segment .275 mm.

Seventh instar: Length 15 mm.; width of head 1.74 mm.; coloration the same

PLATE XIV.

SAWFLIES OF THE GENUS *NEUROTOMA*

except sternum of pro- and mesothorax lacking the brown areas; subanal appendage body colored or with the second and third segments brown, the length of basal segment .40 mm.; second segment .20 mm.; terminal segment .25 mm.

Eighth instar: Length 22 mm.; width of head 2.0 mm.; coloration same except head a light yellowish brown with very faint darker spots; lateral margin and tips of mandibles, palpi only, a small lateral area behind dorsal prothoracic shield, a small area posterior to the dark spot above the prothoracic legs, and terminal segment of subanal appendage dark brown, almost black. Two small dots on sternum of metathorax, tenth abdominal tergum and sternum with a colored patch on each side which may be faintly connected along caudal margin on the tergum, but are not connected on the sternum (fig. 8), and a small area on lateral mesothorax light brown. Basal segment of subanal process .50 mm. in length; second segment .20 mm.; terminal segment .30 mm.

In collections of Cornell University, The United States National Museum and the Illinois Natural History Survey.

Differs from other Pamphiliid larvae chiefly by having the subanal appendage with the second segment shorter than the third, and from the other Nearctic species of *Neurotoma* as indicated in the above key to larvae.

Neurotoma fasciata (Norton)

Lyda fasciata Norton, Proc. Ent. Soc. Phil., 1862, I:200.

Lyda fasciata Norton, Trans. Amer. Ent. Soc., 1869, II:335.

Pamphilius fasciatus W. F. Kirby, List. Hymen. Brit. Mus., 1882, I:346.

Lyda fasciata Packard, Rep. U. S. Ent. Comm., 1890, V:524, fig. 183.

Neurotoma fasciata Konow, Ann. Hofmus. Wien., 1897, XII:241, 254.

Neurotoma fasciata J. B. Smith, Ins. N. Jersey., 1900., p. 602.

Neurotoma fasciata Howard, Ins. Book., 1901, pl. XIV, fig. 15.

Neurotoma fasciata Konow, Syst. Zusammenst. Chalcidog., 1903, I:179, 184.

Neurotoma fasciata MacGillivray, Conn. Geol. nat. Hist. Surv. Bull., 1916, XXII:37.

Neurotoma fasciata A. Klima, Hymen. Cat., 1937., III:32, 33.

This species may be separated by color characters which are fairly constant as well as by characters in the penis valve of the male (fig. 6).

Female. Length of body 12 mm.; length of front wing 10 mm.; width of head 3.2 mm. Color: Antennae, head, body, coxae, trochanters, basal half of femora, base of labial and maxillary palpi, and stigma dull black; following parts yellow: shield-shaped spot between antennae extending to tip of clypeus, tips of labial and maxillary palpi, middle of mandible, spot above eye, tegulae, scutellum, postscutellum, a triangular spot on the caudo-lateral angles of the third to sixth tergal segments, four transverse lines on the same segments beneath, and a spot on coxae. A broad blackish band covers basal two-thirds of front and most of hind wings, fading to tips of wings which are hyaline.

Head above middle of eye and basal two segments of antennae coarsely pitted. Head below middle of eye polished. Terminal segments of antennae finely pitted, dull.

One specimen in the Cornell University collection varies somewhat in color with two additional spots on inner angle of eye and a spot on lateral pronotum yellow.

Male. Similar to the female with the following exceptions: anterior wings with black and hyaline more plainly demarked, not fading as in female; trochanters and femora entirely, spot on caudo-lateral angle of seventh segment, and a line on venter of corresponding segment yellow.

Holotype—♀, from Pennsylvania, in the collection of the American Entomological Society.

Distribution: Pa., N. Y., Conn. Mass.

The larvae are not as destructive as those of *N. inconspicua* and are reported as feeding upon wild cherries where they live gregariously and web the foliage.

Neurotoma inconspicua (Norton)*Lyda inconspicua* Norton, Trans. Amer. Ent. Soc., 1868, II:341.*Lyda inconspicua* Provancher, Natural. Canada., 1878, X:206.*Pamphilus inconspicuus* W. F. Kirby, List. Hymen. Brit. Mus., 1882, 1:350.*Lyda inconspicua* Provancher, Faun. entom. Canad. Hymen., 1883, p. 232.*Lyda rufipes* Marlatt, S. Dak. Ag. Ex. Sta. Bull., 1896, XLVIII:17. New synonymy*Pamphilus inconspicua* Konow, Ann. Hofmus. Wien., 1897, 1:243, 250, 254.*Neurotoma inconspicua* J. B. Smith, Ins. New Jersey, 1900, p. 602.*Pamphilus inconspicua* Konow, Syst. Zusammenst. Chalcidog., 1903, 1:191, 217.*Neurotoma inconspicua* MacGillivray, Conn. Geol. nat. Hist. Surv. Bull., 1916, XXII:37.*Itycorsia? rufipes* A. Klima, Hymen. Cat., 1937, III: 19.*Neurotoma inconspicua* A. Klima, Hymen. Cat., 1937, III:36.

This species may likewise be separated by color characters which are rather constant and by differences in the penis valve of the male (fig. 5).

Female. Length of body 8.7-9 mm.; length of front wing 7.8 mm.; width of head 2.5 mm. Color: Antennae, tips of mandibles, body, tarsi, basal half of coxae, and stigma black; tegulae and dot behind eye yellow; mandibles, femora, tibia, and usually apex of coxae rufous; wings hyaline with a faint fuscous band behind stigma in front wings and on apical region of hind wings.

Head and the two basal segments of antennae coarsely pitted; remaining antennal segments dull and finely punctate.

Male. Similar to female with the following exceptions: yellow spot behind eye missing; length of body 6.5-7 mm.; width of head 2 mm.

Holotype—♀, from Pennsylvania, in the United States National Museum.

Distribution. Pa., N. Y., Mass., S. Dak., Man.

This insect, known in the economic literature as the plum web-spinning sawfly, has long been recognized as an injurious species on plums and sand cherries. The larvae are gregarious, webbing the entire tree with webs not unlike those of the fall web worm. According to Severin,* it is the most serious pest of plums in South Dakota. Sporadic local infestations have also been reported from other sections of the country.

EXPLANATION OF PLATE XIV

LARVAL STRUCTURES

(Third instar)

- Fig. 1. *Neurotoma crataegi*. Head and thorax.
 Fig. 2. *Neurotoma crataegi*. Fourth abdominal segment.
 Fig. 3. *Neurotoma crataegi*. Terminal abdominal segment.
 Fig. 7. *Neurotoma crataegi*. Antenna. Ventral view.
 (Eighth instar)
 Fig. 8. *Neurotoma crataegi*. Sternum of tenth abdominal segment.

ADULT STRUCTURES

- Fig. 4. *Neurotoma crataegi*. Penis valve.
 Fig. 5. *Neurotoma inconspicua*. Penis valve.
 Fig. 6. *Neurotoma fasciata*. Penis valve.
 Fig. 9. *Neurotoma* sp. Anterior margin of front wing.
 Fig. 10. *Neurotoma crataegi*. Anterior margin of front wing.

ABBREVIATIONS USED

- | | |
|---------------------------|---------------------------|
| an-antecoria | sen-sensorium |
| au-anus | sp-spiracle |
| msh-mesothoracic spiracle | srp-suranal process |
| sba-subanal process | tsp-metathoracic spiracle |

TWO APPARENTLY NEW CANADIAN SPECIES OF *SPARGANOTHIS*

BY T. N. FREEMAN,
 Ottawa, Ont.

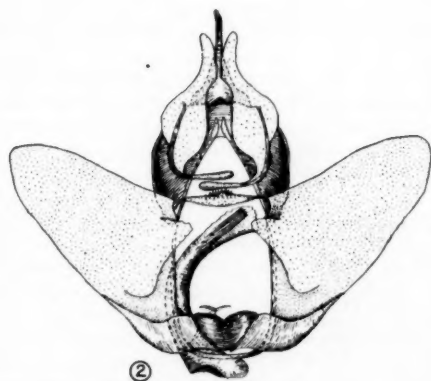
Sparganothis hudsoniana n. sp.

Palpi, vertex, and thorax, fawn colored. Frons with appressed white scales, overhung with long ochreous scales.

*Severin, H. C. The Plum web-spinning Sawfly. S. Dak. State Ent. Tech. Bull., No. 1, 53 pp., 11 figs. (1920).

§ Contribution No. 2014, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

Male. Fore wing above, light fawn; finely and uniformly reticulate with purplish black, two or three reticulations widened at the costal third, with the spaces between these reticulations reflecting cupreous and causing this area to appear as an indistinct costal spot; a similar costal spot two-thirds from the base, and one at the middle near the edge of the posterior margin; a small oblong discal spot at the end of the cell. Fore wing beneath with disc fuscous; costal and apical margins fawn colored, becoming paler along the costa toward the base;



1. Male genitalia of holotype of *S. hudsoniana* n. sp.
2. Male genitalia of paratype of *S. putmanana* n. sp.

veins and reticulations distinct. Hind wing above fuscous, with uniform, dark reticulations; beneath, similar to, but somewhat paler than the upper surface. Fringes of both wings pale, shining. Expanse 18.5 mm.

Male genitalia (Fig. 1). Uncus long, slender, curved; gnathos broad, with long hairs and converging, blunt, slightly emarginate apices; arms of gnathos strap-like with spatulate tips which bear short strong hairs; transtilla well developed, arcuate, with dorsal surface slightly emarginate, and bearing numerous short, thick spines; clasper broad, spatulate, chitinized at basal third, broadly lobed inwardly; aedeagus pistol-shaped, membranous at apex; cornuti cluster present.

Female. Fore wing above ochreous, very finely reticulate with darker scaling; costa with two dark reddish-ochre spots, one at the basal two-fifths and extending from the costal edge to the radial sector, the other, situated three-quarters from the base, is larger, its outer edge gradually shading into the ground color; posterior margin with a similar spot three-fifths from the base; discal spot present though somewhat obscure. (In one specimen the first costal and the dorsal spot are joined to form an oblique dark band across the wing). Fore wing beneath slightly reticulate, with costal and apical margins ochreous; disc fuscous, with distinct discal spot. Hind wing fuscous above, not or very slightly reticulate; beneath fuscous with distinct discal dot. Fringes pale, shining. Expanse 16.5 mm.

Holotype—♂, Churchill, Man., July 15, 1937, (W. J. Brown); No. 5111 in the Canadian National Collection, Ottawa, Ont.

Allotype—♀, same data as holotype.

Paratypes—1 ♂, 1 ♀, Cameron Bay, Great Bear Lake, N. W. T., July 16 and July 25 respectively, 1937, (T. N. Freeman).

Sparganothis putmanana n. sp

Head and thorax ochreous. Palpi purplish-fuscous outwardly.

Male. Fore wing above bright ochreous; obliquely crossed by an irregular, dark purplish streak which extends from the basal costal third to the middle of the posterior margin, and which is narrowed near its middle and at the posterior margin to form a fine line; costal two-thirds with a blotch of dark purplish, beyond which are two or three short dashes of the same color, the outer dash extending backward, as a somewhat wavy line, to the outer fifth of the posterior margin; terminal line narrow, dark purplish; fringe concolorous with the ground color. Fore wing beneath dark fuscous with contrasting pale costa and fringe. Hind wing above fuscous with pale fringe; beneath pale fuscous. Expanse 21 mm.

Male genitalia (Fig. 2). Uncus long, slender, curved; gnathos broad with long hairs and diverging finger-like apices; arms of gnathos long, narrow, clavate, the apices bearing short strong hairs; transtilla as in *hudsoniana* but narrower; clasper broad, flat and membranous, with bluntly pointed apex and broadly lobed inwardly; aedeagus cylindrical, strongly arcuate with membranous apex and cornuti cluster.

Female. Above, fore wing similar to that of the male but lacking the fine terminal line. Hind wing lighter than that of the male. Beneath, fore wing much lighter than that of the male, otherwise similar. Expanse 22 mm.

Holotype—♂, St. David's, Ont., June 26, 1932, (W. L. Putman. Reared from *Rubus idaeus*); No. 5112 in the Canadian National Collection, Ottawa.

Allotype—♀, same data as holotype, June 22, 1932.

Paratypes—12 ♂♂, 10 ♀♀, reared on various dates in late June from 1932-1937 by Mr. W. L. Putman from the following plants: *Rubus idaeus*, *Solidago* sp., *Rosa* sp., *Aster* sp., *Quercus rubra* and *Prunus serotina*.

This species shows considerable variation in the ground color and in the intensity of the markings. The males vary in color from dark to pallid ochreous and the finer markings become obsolete in some specimens. The females vary from pale ochreous, with the maculation reduced to two costal spots only, to very dark ochreous, often with purplish reflection and consequent obscured markings.

Named in honor of Mr. W. L. Putman of Vineland Station, Ont., who has obtained excellent results in the rearing of various species of Microlepidoptera.

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Mailed Thursday, October 31st, 1940.

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